REMARKS

The claims are claims 1 to 4 and 6 to 9.

The application has been amended to correct a minor error.

Claim 1 is amended. Claims 5 and 10 are canceled. Claim 1 is amended to emphasize that it recites statutory subject matter.

Claims 1 to 5 were rejected under 35 U.S.C. 101 as directed to non-statutory subject matter. The OFFICE ACTION states that claims to processes that do nothing more than solve mathematical problems or manipulate abstract ideas or concepts are non-statutory and that the recited acts manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing and are not applied to appropriate subject matter. The OFFICE ACTION further states a process consisting solely of mathematical operations without some claimed practical application is drawn to non-statutory subject matter.

Amended claims 1 to 5 recite statutory subject matter. As amended claim 1 recites "A method of converting an input digital audio signal into an output digital audio signal having a modified time scale." Thus on its face claim 1 recites conversion of one tangible thing (an input audio signal) into another tangible thing (an output digital audio signal having a modified time scale). Stated this way the practical, real-word application of the invention is apparent. This application states at page 2, lines 5 to 8 that application of the time-scale modification of this invention include "intelligible sound in fast-forward play, real-time music manipulation, foreign language training." The original application teaches at page 3, lines 19 to 21 that the particular conversion of this invention is useful to improve the quality of the time-scale modification. This application teaches at page 5, line 5 to page 6, line 25 and illustrates in Figure 1 a concrete apparatus system 100 which can practice this invention.

The Applicants submit that the utility asserted in the above quoted portion of the application is substantial and specific. Claims 1 to 5 recite a data conversion method and the asserted utility is a type of data processing using the data conversion method. The asserted utility employs system 100 illustrated in Figure 1 in a manner ordinarily expected of such parts by one skilled in the art. Accordingly this asserted utility is more than an insubstantial, nonspecific or throw-away utility. The Examiner has made no argument that this asserted utility is not credible.

These claims are statutory subject matter because the claimed method produces a useful, tangible and concrete result. This asserted utility is tied to particular method limitations. Thus the asserted utility is tangible. The Applicants urge that the use of the claimed method is repeatable. The claimed method will provide the same result upon repeated use. Thus this use is concrete. Accordingly, claims 1 to 5 have a practical application with a useful, tangible and concrete result and are thus statutory subject matter.

As amended claims 1 to 5 include both physical transformation of something which is useful outside the computer and a practical application that produces a useful, concrete and tangible result. Accordingly, claims 1 to 5 are statutory subject matter.

Claims 1 to 4 and 6 to 9 were rejected under 35 U.S.C. 103(a) as made obvious by the combination of Dolson U.S. Patent No. 6,112,169 and Julius 0. Smith, Bark and ERB Bilinear Transforms, in IEEE Transactions on Speech and Audio Processing, Vol. 7, No. 6, November 1999.

Claims 1 and 6 recite subject matter not made obvious by the combination of Dolson and Smith. Claims 1 and 6 recite partitioning "the spectrum into a plurality of contiguous spectral bands according to a Bark scale where each spectral band has an extent dependent upon human frequency perception." The OFFICE

ACTION states at page 4, lines 17 to 21:

> "Dotson does not disclose partitioning the spectrum into a plurality of contiguous spectral bands according to a Bark scale where each spectral band has an extent dependent upon human frequency perception. However this feature is well known in the art as evidenced by Smith et al, who discloses that a Bark Scale has the critical bands of human hearing a width of one Bark."

The OFFICE ACTION cites the first paragraph of the Introduction as making obvious using Bark frequency band in time-scale modification. Smith states at page 697, left column, lines 29 to 39:

> "With the increasing use of frequency=domain techniques in audio signal processing applications such as audio compression, there is increasing emphasis on psychoacoustic-based spectral measures [1]-[4]. One of the classic approaches is to analyze and process spectra over the Bark frequency scale (also called "critical band rate") [5]-[9]. Based on the results of many psychoacoutic experiments, the Bark scale is defined so that the critical bands of human hearing have a width of on Bark. By representing spectral energy (in dB) over the Bark scale, a closer correspondence is obtained with spectral information processing in the ear."

Smith includes extensive description of the use of the Bark scale in allpass filtering. Smith includes no teaching of the claimed time-scale modification or that Bark frequency bands could be applicable to time-scale modification. Accordingly, claims 1 and 6 are allowable over the combination of Dolson and Smith.

Claims 1 and 6 recite further subject matter not made obvious by the combination of Dolson and Smith. Claims 1 and 6 recite calculating "a phase difference for each of a predetermined number of spectral lines near the dominant spectral line within each spectral band as the phase difference of the corresponding dominant

spectral line." The OFFICE ACTION cites column 5, lines 34 to 37 as making obvious this subject matter, stating that the claimed predetermined number of spectral lines is the number of divided frequency regions in Dolson. The Applicant respectfully submits this is incorrect. The above quote portions of claims 1 and 6 require the predetermined number of spectral lines to be "within each spectral band." Dolson teaches at column 5, lines 17 to 20:

> "At step 206, signal processing system 100 divides each magnitude spectrum into contiguous frequency regions. Each contiguous frequency region includes a single significant peak."

This portion of Dolson indicates that the supposed "predetermined number" cited in the OFFICE ACTION is not a predetermined number. This portion of Dolson does not state that the number of contiguous frequency regions is predetermined. Instead, this portion of Dolson states the number of such contiguous frequency regions yields a single significant peak per region. Thus the number of contiguous frequency regions is not predetermined but depends upon the data processed. Further, even if this portion of Dolson makes obvious a predetermined number, this is a different number than claimed. In the Examiner's argument including Dolson this predetermined number is a number of contiguous frequency bands. However, claims 1 and 6 recite "a predetermined number of spectral lines...within each spectral band." This is not a number of bands as supposedly taught in Dolson, but a number of spectral lines within each band. Claims 1 and 6 recite that this predetermined number of spectral lines are "near the dominant spectral line" within the band. In contrast Dolson teaches "a single significant peak" within each contiguous frequency band. Thus the supposed predetermined number of the cited teachings of Dolson is a different predetermined number than claimed in claims 1 and 6.

Accordingly, claims 1 and 6 are allowable over the combination of Dolson and Smith.

Claims 1 and 6 recite still further subject matter not made obvious by the combination of Dolson and Smith. Claims 1 and 6 recite calculating "a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm." The OFFICE ACTION cites column 5, lines 34 to 37 (quoted above) as making obvious this subject matter, stating while Dolson states that it is preferable to only calculate for significant peaks, this indicates that the phase of other peaks may be calculated. The Applicant respectfully submits that Dolson's disclosure of "a single significant peak" fails to make obvious the recited "other spectral lines" of claims 1 and 6. Note that claims 1 and 6 recite two different types of phase difference calculations: a first type for the predetermined number of spectral lines near the dominant spectral line; and a second type for the other spectral lines. The portion of Dolson cited in the OFFICE ACTION includes an implication of peaks other than the single significant peak. However, the OFFICE ACTION includes no argument how the same portion of Dolson makes obvious differing phase calculations for two different groups of spectral lines not the dominant spectral line. Accordingly, claims 1 and 6 are not made obvious by the combination of Dolson and Smith.

Claims 2 and 7 recite further subject matter not made obvious by the combination of Dolson and Smith. Claims 2 and 7 recite "the predetermined number of spectral lines near the dominant spectral line is 4 for a 1024-point spectrum." The OFFICE ACTION cites no portions of either reference as making obvious this limitation. The OFFICE ACTION states at page 5, lines 4 to 9:

> "Dolson does not disclose: the predetermined number of spectral lines near the dominant spectral line is 4 for a 1024-point spectrum. However this feature is well known in the

> art to allow a human to easily pick out the spectral lines due to the distribution of the amplitudes. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use four dominant spectral lines for a 1024-point spectrum."

As pointed out above, the combination of Dolson and Smith fail to make obvious the predetermined number of spectral lines near the peaks recited in respective base claims 1 and 6. Accordingly, the combination of Dolson and Smith cannot make obvious the particular predetermined number 4 recited in claims 2 and 7. In addition, the OFFICE ACTION cites no portions of either reference as teaching 4 spectral lines nor a 1024-point spectrum as recited in claims 2 and 7. The above quoted statements of the OFFICE ACTION are at most an indication of OFFICIAL NOTICE or within the knowledge of someone in the Patent Office of the fact that "the predetermined number of spectral lines near the dominant spectral line is 4 for a 1024-point spectrum." The Applicants respectfully traverse this OFFICIAL NOTICE and request citation of relevant art according to 37 CFR 1.104(c)(2). In the absence of citation of art to make obvious this limitation of claims 2 and 7, these claims are not made obvious by the combination of Dolson and Smith.

Claims 3 and 8 recite subject matter not made obvious by the combination of Dolson and Smith. Claims 3 and 8 recite merging "nearby spectral lines that are within a predetermined frequency range of each other prior to calculating the phase difference." The OFFICE ACTION cites Dolson at column 5, lines 21 to 24 as making obvious this limitation, stating that the spectral lines are merged when the borders between contiguous frequency regions are selected. Dolson states at column 5, lines 21 to 24:

> "In one embodiment, the channel midway between two significant peaks becomes the border between the corresponding contiguous frequency regions."

The Applicants submit this teaching of Dolson indicates how the border between two of the contiguous frequency regions is determined. It includes no teaching regarding merging spectral lines or of the claimed predetermined frequency range. Note that determining the frequency region border as midway between two significant peaks makes this determination dependent upon the data and not upon a predetermined frequency range as claimed. Further, this teaching of Dolson includes no indication that the border determination has any effect upon a phase calculation as recited in claims 3 and 8. Accordingly, claims 3 and 8 are not made obvious by the combination of Dolson and Smith.

Claims 4 and 9 recite subject matter not made obvious by the combination of Dolson and Smith. Claims 4 and 9 recite partitioning "the spectrum into a plurality of contiguous spectral bands according to a Bark scale employs predetermined spectral bands unrelated to the digital audio signal." The OFFICE ACTION cites column 5, lines 19 and 20 of Dolson as making obvious this subject matter stating that Dolson's teaches "partitioning the spectrum into a plurality of contiguous spectral bands according to a Bark scale employs predetermined spectral bands unrelated to the digital audio signal." This reasoning is incorrect. First, the OFFICE ACTION states at page 4, lines 17 to 19 that Dolson does not disclose partitioning the spectrum according to a Bark scale. Thus the cited portion of Dolson cannot make obvious this limitation of claims 4 and 9. In addition, the cited portion of Dolson does not teach the claimed "predetermined spectral bands unrelated to the digital audio signal." Dolson states at column 5, lines 17 to 24 (including the portion cited by the Examiner):

> "At step 206, signal processing system 100 divides each magnitude spectrum into contiguous frequency regions. Each contiguous frequency region includes a single significant peak. The borders between contiguous frequency regions may be

> selected in a number of ways. In one embodiment, the channel midway between two significant peaks becomes the border between the corresponding contiguous frequency regions."

This disclosure of Dolson states that the borders between frequency regions can be selected in numerous ways. However, this portion of Dolson fails to teach that the borders of the frequency regions are predetermined and not dependent upon the digital audio signal. This portion of Dolson states that reach region includes "a single significant peak." This disclosure is inconsistent with the claimed predetermined bands. The claimed predetermined bands may result in one, plural or no significant peaks. The Applicants respectfully submit the only way to always have exactly one significant peak in each region is to select the regions to make this happen. This portion of Dolson states that one manner of dividing the frequency regions makes the border midway between two significant peaks. Such a partitioning is clearly dependent upon the digital audio data contrary to the recitations of claims 4 and 9. The general language of Dolson ("The borders between contiguous frequency regions may be selected in a number of ways.") does not exclude the recited predetermined spectral bands. However, the general limitation ("Each contiguous frequency region includes a single significant peak.") and the only example of Dolson ("In one embodiment, the channel midway between two significant peaks becomes the border between the corresponding contiguous frequency regions.") are contrary to an express limitation of claims 4 and 9 ("predetermined spectral bands unrelated to the digital audio signal."). The Applicants respectfully submit that the limitations of claims 4 and 9 would not be obvious to one skilled in the art from this disclosure of Dolson. Accordingly, claims 4 and 9 are allowable over the combination of Dolson and Smith.

Claims 5 and 10 recite subject matter not made obvious by the combination of Dolson and Smith. Claims 5 and 10 recite

partitioning "the spectrum into a plurality of contiguous spectral bands according to a Bark scale by adjusting boundaries of spectral bands to maintain important frequency groups within the same spectral band." The OFFICE ACTION cites column 5, lines 20 to 24 of Dolson as making obvious this subject matter stating that Dolson's teaches the partitioning the spectrum into a plurality of contiguous spectral bands "includes adjusting boundaries of spectral bands to maintain important frequency groups within the same spectral band." This reasoning is incorrect. First, the OFFICE ACTION states at page 4, lines 17 to 19 that Dolson does not disclose partitioning the spectrum according to a Bark scale. Thus the cited portion of Dolson cannot make obvious this limitation of claims 5 and 10. The operative portion of Dolson is quoted above. This portion of Dolson discloses of making the channel midway between significant peaks the border between frequency regions. Dolson thus teaches separating these significant peaks. The Applicants respectfully submit this teaching regarding significant peaks does not make obvious the "important frequency groups" recited in claims 5 and 10. In particular, the Applicants respectfully submit the claimed important frequency groups differ from and are unobvious over the significant peaks taught in Dolson. Accordingly, claims 5 and 10 are allowable over the combination of Dolson and Smith.

The Applicants respectfully submit that all the present claims are allowable for the reasons set forth above. Therefore early reconsideration and advance to issue are respectfully requested.

If the Examiner has any questions or other correspondence regarding this application, Applicants request that the Examiner contact Applicants' attorney at the below listed telephone number and address to facilitate prosecution.

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Respectfully submitted,

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